Shelter Watch

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Our Mission:

We are committed to saving lives and reducing suffering of homeless dogs and cats through education, advancement of knowledge and shelter outreach.

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From the Director's Desk

This month we have chosen to discuss a parasitic infection of cats that rarely causes disease in this species. It can, however, cause severe to fatal infections in immunocompromised people and an uncommon, but severe disease in human babies. The disease is toxoplasmosis and it is caused by a protozoan parasite, *Toxoplasma gondii*. The parasite is shed for a short period of time in the stool of infected cats and can be found in the tissues of other species (e.g., mice, cattle, pigs) (see the article describing its life cycle). If a woman is infected during pregnancy, the parasite can cause abortion, stillbirth or migrate to the developing baby and cause damage to several organs, including the brain, eyes, skin or ears. Most of you have probably heard of this disease, as it is frequently highlighted in women's magazines and in other lay literature, warning pregnant women to take precautions. For many years it has been thought that women are most likely to get infected by eating undercooked meat. Recently, however, the development of a new test for toxoplasmosis in women (that can identify the likely source of the infection), suggests that the feces of cats (or things contaminated with cat feces) may be responsible for most human infections that cause sick babies. [1]

Interestingly, if you read a recent article in *The Atlantic* (March 2012), you may have encountered speculation (suggested by some recent research) that human toxoplasma infection may also have long-term effects on age groups other than babies infected before birth. Some studies have linked changes in human behavior (e.g., engaging in risky activities) and smell to infections with *Toxoplasma gondii.* [2] Other studies have suggested that several infectious agents (e.g., influenza virus, rubella virus), including *Toxoplasma* acquired during pregnancy, can increase risk of schizophrenia in the children of infected moms.[3] Before getting alarmed, a causal relationship between toxoplasma infection and schizophrenia or changes in human behavior has NOT been established. We're talking about these articles because you may encounter people who are surrendering their cats, fearing that they, or their loved ones, may get sick.

The good news is that, whether you (or cat owners) are concerned about congenital infections in babies or about other potential adverse effects, infection is easy to avoid. Washing vegetables well before eating them and avoiding contact with cat feces or eating well-cooked meat will prevent you from becoming infected!!! Fear of toxoplasmosis is not a good reason for taking a cat to the shelter.

References:

[1]Boyer, K., Hill, D. et al (2011) Unrecognized ingestion of *Toxoplasma gondii* oocysts leads to congenital Toxoplasmosis and causes epidemics in North America. Clinic Infect Dis 53:1081-1089.

[2]Flegr, J. (2011) Fatal attraction phenomenon in humans – cat odour attractiveness increased for *Toxoplasma*-infected men while decreased for infected women. Neglected Tropical Diseases, Nov 2011/ Vol.5/ Issue 11. Open ACCESS, www.plosntds.org.

[3]Brown, AS (2011) Exposure to prenatal infection and risk of Schizophrenia. Frontiers in Psychiatry. Nov 2011/Vol.2/Article 63.

Jan M. Scarlett, DVM, Ph.D.

Toxoplasmosis-Life Cycle in a Nutshell: Dr. Nicole Putney

Oocysts (resistant stage for environmental transmission; only develop in and shed by cats). Top image: a unsporulated, non-infective oocyst. Bottom image: sporulated, infective oocyst.

Protozoa (such as *Toxoplasma gondii*) have complicated life cycles that may not seem worth remembering. However, a cursory understanding of the different life stages helps makes sense of the management of the infection as well as environmental decontamination.

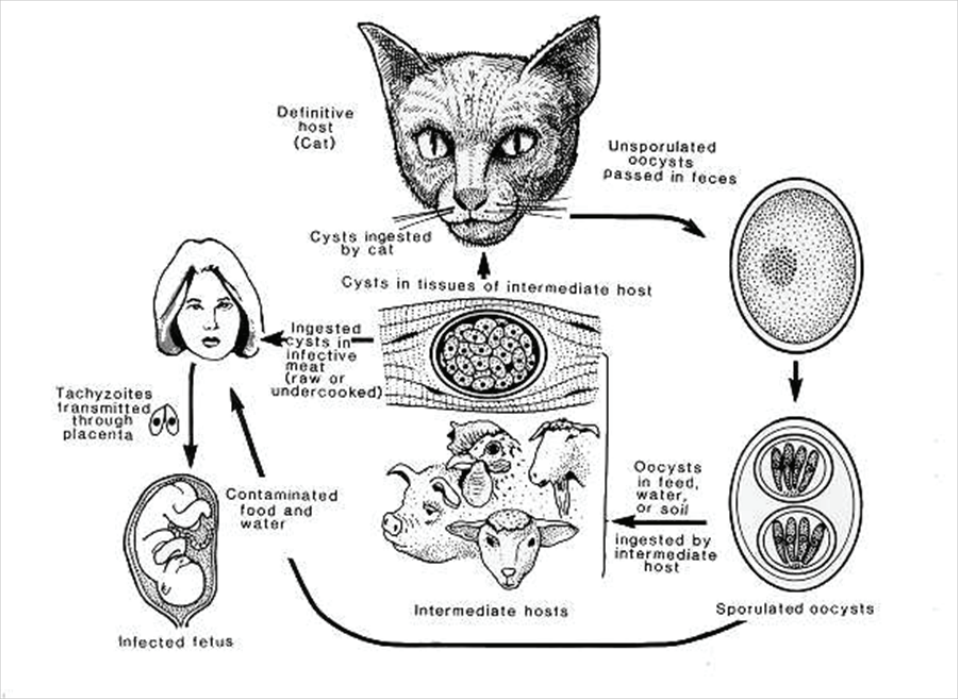
The journey of *T. gondii* begins in the feline intestine, where *oocysts* form and are shed into the environment. Cats are the only species known to produce the *oocyst* stage (thus, they are known as the *definitive host*), and although the *oocysts* may only be shed for 1-2 weeks, large amounts may be shed. In cat feces, the *oocyst* requires 1 to 5 days before *sporulating*, which is required before the *oocyst* can be infective to others. Thus, we recommend cleaning litter boxes everyday in the shelter as well as in households with pregnant women or other immunocompromised individuals. *Sporulated oocysts* can remain stable in the environment for months to years – they are most effectively destroyed by steam heat.

After *sporulation*, infection of other hosts can occur through fecal-oral transmission. This may be a mode of transmission directly to humans via contaminated water or soil (e.g. gardens where cats have defecated). However transmission often occurs to food animals before reaching a human (or feline) host.

After ingestion, *oocysts* transform into the next stage, *tachyzoites*. *Tachyzoites* differentiate into the next stage, *bradyzoites*, and embed into muscle and neural tissue, where they form tissue cysts. Once in the muscle, they may be transmitted to humans or other animals via ingestion of undercooked meat. Cats may also become infected or re-infected from eating infected prey such as mice. After ingestion, the tissue cysts release *bradyzoites* in the stomach and intestine of the new host. The newly released bradyzoites invade cells and either form cysts or begin reproduction to re-start the life cycle. As mentioned previously, the only species in which this reproductive stage takes places is the cat.

Thus, controlling the feces of the *definitive host* (the cat) is of utmost importance in controlling the transmission of *Toxoplasma gondii*, as is thoroughly cooking meat. Precautions to take include not only cleaning the litter box daily, but also wearing gloves while gardening and covering sandboxes when not in use. Keeping cats indoors-only greatly decreases their exposure to tissue cysts from infected prey.

Resources:
CDC website: http://www.cdc.gov/parasites/toxoplasmosis/index.html
Companion Animal Parasite Council: http://www.capcvet.org/capc-recommendations/toxoplasma



Toxoplasmosis-Disease Manifestation in Cats: Dr. Kate Gollon

Toxoplasmosis is a common and widespread protozoan parasite. At one point or another, most cats are exposed to this disease. Fortunately, most cats have an adequate immune system to effectively fight off infection and, therefore, do not show any clinical signs of illness. Kittens, geriatric cats, and immune-deficient cats (those with feline leukemia, feline immunodeficiency virus, or other concurrent illness) are more likely to show signs of infection and potentially succumb to the disease.

Signs of illness can either occur at the time of infection (acutely) or years after initial infection. This later onset of illness occurs when tissue-encysted organisms become active again, often due to something compromising the cat's immune system. This can come in the form of stress (certainly present in the shelter!) or other illness.

For animals that show signs the disease is often systemic -- that is, it can affect many different body systems at once. Therefore, clinical signs can vary greatly between individual cats.

The most common clinical signs are vague: lethargy, depression, weight loss, lack of appetite and a fever. More specific signs include inflammation in the eyes, pneumonia, gastrointestinal signs (vomiting, diarrhea, abdominal pain) and/or neurologic signs (difficulty walking, weakness, seizures).

Routine diagnostic testing for toxoplasmosis checks for two different types of antibodies in the blood, and can be difficult to interpret in some cases. Most cats that have the disease respond to treatment with clindamycin and recover fully. Therefore, a couple weeks of treatment will often confirm or refute a presumptive diagnosis of Toxoplasmosis.

Fortunately, an outbreak of Toxoplasmosis is exceedingly unlikely because of the lifecycle, the fact that many exposed cats are asymptomatic, and the late onset of disease. If you suspect toxoplasmosis in one of your shelter's cats, please consult with your veterinarian.

"At one point or another, most cats are exposed to this disease; fortunately, most cats have an adequate immune system to effectively fight off infection and, therefore, do not show any clinical signs of illness."

What's New with *Toxoplasmagondii* infection in rodents and humans?: Dr. Jan Scarlett

As mentioned in a previous article, the definitive host of *Toxoplasma gondii* is the domestic cat. In order to reproduce itself, the parasite must be consumed by a cat. The parasite does so by forming cysts in the muscles of mice and rats, commonly found on the dinner menu of cats. Interestingly, data now strongly support this parasite's ability to alter the behavior of infected rodents, such that they are more likely to become dinner for a cat. Research has shown that infected rats and mice are more active (and therefore more likely to attract the attention of a cat) and more likely to explore new environments (putting them in harm's way) than their uninfected counterparts. Even more amazingly, they are attracted (as opposed to being repulsed as are uninfected rodents) by the smell of cats and their urine presumably causing them to go to areas that cats frequent. These observations, coupled with studies suggesting that infections of pregnant women are associated with elevated risk of schizophrenia in their offspring, have spawned new studies looking at associations of human behavior and *Toxoplasma* infections.

A few recent studies are intriguing (although FAR from conclusive). Studies by Flegr et al (2011) found that male students infected with *Toxoplasma gondii* had slower reaction times, engaged in more risky behaviors, and found the smell of cat urine less offensive than their uninfected male student counterparts. The same was not true for female students. Infected female students were more outgoing, friendly, and more attractive to men than their uninfected counterparts. Another study found that people with latent *Toxoplasma* infections were 2.7 times more likely to be involved in an automobile accident than non infected folks.

While these research results in people are interesting, they are not conclusive. What is most important is that infections with *Toxoplasma gondii* are declining in the U.S. and everyone can avoid infection by following the recommendations for prevention.

The Skinny-10 Things Shelter Staff and Volunteers Should Know About Toxoplasmosis: Dr. Elizabeth Berliner

- Toxoplasmosis is a zoonotic disease, meaning it can be transmitted from cats (the definitive host) to people (an intermediate host), as well as other animals (also intermediate hosts).
- More people get toxoplasmosis from raw or undercooked meat, unwashed fruits and vegetables, unpasteurized milk, or interaction with contaminated soil, rather than from cats.
- Pregnant women, children, and immune-compromised individuals are at highest risk for complications from Toxoplasmosis infection from any of the sources.
- Shelter staff and volunteers should be educated about risks, and perform a risk assessment prior to cleaning litter boxes in the shelter.
- Cats shed the organism for only a few days, and so on average the chance of human exposure is small.
- Young cats (under 1 year) and cats under stress are more likely to shed in higher amounts. This describes the majority of shelter cats in many organizations.
- Oocysts, the infective form of the organism, are shed in feces. They must sporulate prior to causing infection, which takes 1-5 days. Daily litterbox cleaning or the use of daily disposable boxes greatly decreases the risk of transmission to people.
- Most cats do not show signs of infection.
- Infections in people can be very serious, including irreversible damage to the fetus of a newly infected pregnant woman, or an onset of neurological signs in a previously infected person now undergoing chemotherapy or other immune-suppressing therapy.
- Handwashing is critical to shelter worker and shelter pet safety, regardless of the infective agent in question; this cannot be over-emphasized.

"Handwashing is critical to shelter worker and shelter pet safety, regardless of the infective agent in question; this cannot be over-emphasized."

The Kid Test: Ms. Kelley Bollen, MA, CABC

A few months ago I wrote about the canine behavior evaluation and how it allows us to learn a great deal about the dogs in our shelter before we consider them for adoption. This information aids in making better matches with adoptive families, which in turn improves adoption success. One element that is not included in the evaluation procedure that I wrote about is "the doll test". I do not use a doll during the evaluation because I do not believe that testing a dog's reaction to a doll gives you reliable information about how the dog will be around living children. There is simply no way that you can simulate the sights, sounds and actions of a child using an inanimate object. Furthermore, it is the interaction between a dog and a child that can lead to problems, not just the sight of the child.

So while it is impossible to really evaluate the dogs' reaction to real interactions with children, a procedure that I developed and used while working at the MSPCA can help you decide if a particular dog might be a good placement with a particular adoptive family.

Remember the game "Simon Says" that we used to play as children? We use this game in our "kid test". Take the children and the parents into a room and explain to them that we are going to play "Simon Says". Instruct the children to stay behind a line on the floor (that you have laid down before hand) and that they are to do whatever Simon tells them to do during the game. Bring the dog in on a leash and stand in the middle of the room with her. Then start the game by instructing the children – "Simon Says – do jumping jacks".

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The Kid Test: Continued from Page 4

As the children do the jumping jacks you are to watch the dog's reaction. Then instruct the children – "Simon says – scream" and again, you are to watch the dog's reaction. Then instruct – "Simon Says – run around us in a big circle" and you watch the dog to see what her reaction is to these little running beings. Lastly you instruct – "Simon Says – stand still".
At this point you will give the dog the opportunity to move where she wants to go (if it is safe to do so). Does she decide to go visit with the children or try to get as far away from them as possible?

By the end of this fun game we have a better idea of how this dog reacts to these kids doing normal kid things. If the dog tucks her tail, puts her ears back and cowers when the kids jump, scream or run around, and then chooses not to go near them when they are calm, she is probably not the dog for them. If the dog gets overly aroused during the jumping and screaming and tracks the kids with a bit too much intense focus when they run, this is probably not the dog for them. But if the dog can handle all of these kid actions and still want to go interact with them in the end, then this might just be the dog that would do well in this home.

I have found that when you play this game with children, their true personalities come out. If they are rowdy, active, boisterous kids they will become this way as the game progresses. If they are quiet, calm, introverted children this too will be apparent. I have also found that parents find this game very interesting and helpful and I have never had a parent tell me that they want to adopt a dog who did not have a good reaction to their children during and after the game.
This "Kid test" is another way to help you make the best possible matches between your dogs and potential adopters. Of course it is always critically important to educate the parents and children about dog safety.

Events Calendar

April 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3 Shelter Medicine I Course	4	5 Shelter Medicine I Course	6	7
	Clinical Rotation in Shelter Medicine (2 of 2 Wks) →					
8	9	10 Shelter Medicine I Course	11	12 Shelter Medicine I Course	13	14
				Behavior →		
15	16	17 Shelter Medicine I Course	18	19 Shelter Medicine I Course	20	21
22	23	24	25	26 Shelter Medicine II Course	27	28
	Intern Experience at SPCA of Erie County →					
	Clinical Rotation in Shelter Medicine (2 Wks) →					
29	30					

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